

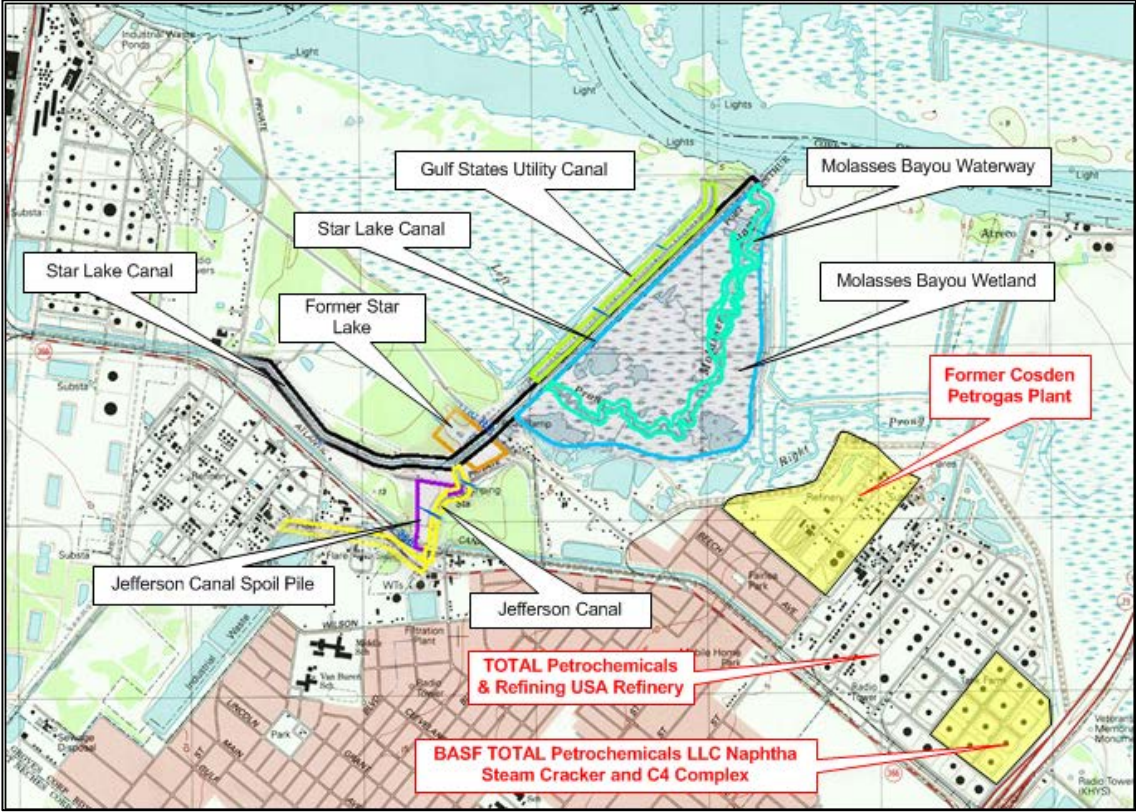
# **Nexus Summary For The TOTAL Petrochemicals & Refining USA, Inc.**



Source: "Total SA Explores Partnership for Port Arthur Refinery Logistics Assets," *American Energy News*, June 16, 2016

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<b>Part I – Site Summary Overview - Total Petrochemicals &amp; Refining USA, Inc.</b>	
<b>Refinery Operational Period</b>	<p>July 1973 to the present</p> <p>American Petrofina, Inc. (“American Petrofina”); Fina Oil and Chemical Company (“Fina Oil”); Atofina Petrochemicals, Inc.; Total Petrochemicals USA, Inc.; and Total Petrochemicals &amp; Refining USA, Inc. (“TOTAL”)</p>
<b>Petrogas Plant Operational Period</b>	<p>circa 1976 to April 1991</p> <p>Cosden Oil &amp; Chemical Company (“Cosden”) and Fina Oil and Chemical Company (“Fina Oil”)</p>
<b>Steam Cracker and C4 Complex Operational Period</b>	<p>2000 to 2012</p> <p>Sabina Petrochemicals LLC (merged into BFLP)</p> <p>1998 to the present</p> <p>BASF TOTAL Petrochemicals LLC f.k.a. BASF FINA Petrochemicals LLC (“BFLP”)</p>
 <p>Figure 1. The topographic map depicts the TOTAL Refinery in relation to the seven highlighted Areas of Investigation (“AOIs”) in the Star Lake Superfund Site.<sup>1</sup> Source: USGS, 1993</p>	

<sup>1</sup> The seven AOIs, as depicted in Figure 1, include Jefferson Canal, Jefferson Canal Spoil Pile, Former Star Lake, Star Lake Canal, Gulf State Utility Canal, Molasses Bayou Waterway, and Molasses Bayou Wetland (Conestoga-Rovers & Associates and Cardno ENTRIX, *Final Tier 2 Remedial Investigation Report*, August 2011, pp. 12–14; USEPA Region 6, *Record of Decision: Star Lake Canal Superfund Site*, September 2013, pp. 1–3).

## Part I – Site Summary Overview - Total Petrochemicals & Refining USA, Inc.

### Nexus Summary

Discharges from the Refinery and Petrogas Plant, containing CERCLA-listed hazardous substances, contributed to contamination present in the Star Lake Canal Superfund Site and the Molasses Bayou Waterway and Molasses Bayou Wetlands AOIs in particular. Available documents do not provide information on potential discharges to the Star Lake Canal Superfund Site from the Naphtha Steam Cracker and C4 Complex.

## Part 2 – Summary of Key Operational Information

### Operational Chronology:

#### July 1973

- American Petrofina acquired the refinery, constructed around 1936, from Sohio.<sup>2</sup> At the time, it had a crude oil throughput capacity of 84,000 bpd.<sup>3</sup>

#### by 1976

- Cosden, a subsidiary of American Petrofina, constructed the Petrogas Plant.<sup>4</sup>

#### 1977

- With the addition of the Petrogas Plant, the refinery's crude oil throughput capacity increased to 110,000 bpd.<sup>5</sup>

#### 1982

- American Petrofina expanded the refinery with a solvent extraction unit, a continuous catalytic reformer, an isomerization unit, a benzene-toluene-xylene unit, a sulfur recovery/SCOT unit, and a hydrodesulfurization unit.<sup>6</sup>

#### as of 1985

- The Petrogas Plant processed natural gas and "pipe steel" off-gas, as well as C-3 liquid from the adjacent refinery. Natural gas was received by pipeline. The plant recovered propane, propylene, butane, and lighter fuel gas from these streams. Fuel gas was sold to Fina Oil and Chemical Company. Propane, propylene, and butane were sold to Texaco and U.S. Steel Corporation. All finished goods produced by Cosden were shipped by truck.<sup>7</sup>

<sup>2</sup> Moody's Industrial Manual, 1990, vol. 1, p. 2571.

<sup>3</sup> "U.S. Refineries: Where, Capacities, Types of Processing," *Oil and Gas Journal*, April 1, 1974, p. 101.

<sup>4</sup> George E. Maxon, Jr., letter to Cosden Oil & Chemical Co., May 6, 1976; Texas Water Quality Board, Notice of Registration, May 3, 1976.

<sup>5</sup> "U.S. Refineries: Location, Capacities, Types of Processing," *Oil and Gas Journal*, March 28, 1977, p. 116.

<sup>6</sup> Port Arthur Centennial History, 1898–1998, p. 93.

<sup>7</sup> Connie Mathews, Texas Department of Water Resources, Telephone Memo to the File, December 2, 1985.

## Part 2 – Summary of Key Operational Information

### 1988

- American Petrofina expanded the refinery with an atmospheric crude unit, an amine treating unit, a saturate gas liquids recovery unit, and a fluid catalytic cracking unit.<sup>8</sup>

### April 1991

- The Petrogas Plant ceased operations. The vessels, columns, and other equipment were cleaned prior to shut down in 1991 and the plant was scheduled to be demolished and sold for scrap sometime after August 1993.<sup>9</sup>

### 1998

- BFLP began construction of a naphtha steam cracker on the eastern portion of the refinery.<sup>10</sup>

### December 2001

- BFLP began operating the naphtha steam cracker to produce ethylene, propylene, and other chemical raw materials.<sup>11</sup>

### 2002

- Sabina Petrochemicals LLC began construction of an integrated C4 olefins complex between the naphtha steam cracker and the refinery tank farm that would include the world's largest single train butadiene extraction unit.<sup>12</sup>

### 2017

- The TOTAL refinery produces transportation fuels, petcoke, aromatics, and LPG. It has a crude oil throughput capacity of 174,000 bpd.<sup>13</sup>

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<sup>8</sup> Port Arthur Centennial History, 1898–1998, p. 93–4.

<sup>9</sup> Jeff Baker, letter to TWC, August 10, 1993.

<sup>10</sup> PR Newswire, “BASF FINA Petrochemicals Celebrates Start of Construction of World’s Largest Steam Cracker,” news release, November 12, 1998.

<sup>11</sup> BASF Corporation, “BASF FINA Petrochemicals LP Celebrates 10 Years of Operations with Port Arthur Area Leaders,” news release, December 6, 2011; BASF FINA Petrochemicals LP, Naphtha Steam Cracker, Port Arthur, Texas, Fact Sheet, April 2006.

<sup>12</sup> BASF Corporation, “BASF FINA Petrochemicals LP Celebrates 10 Years of Operations with Port Arthur Area Leaders,” news release, December 6, 2011; Alan S. Brown, “Shell, BASF, Atofina Approve Port Arthur C4 Olefins Complex,” *Chemical Online*, November 3, 2000; PR Newswire, “BASF, ATOFINA Celebrate Launch of \$1 Billion Steam Cracker,” news release, June 11, 2002.

<sup>13</sup> TOTAL Port Arthur Refinery, Fact Sheet.



### Part 3 – Permits

#### Texas Industrial Wastewater Discharge Permit

Texas Water Commission (“TWC”) industrial wastewater discharge permit No. 00491 was transferred to American Petrofina when it acquired the refinery (the “Site”).<sup>14</sup>

#### NPDES

On September 17, 1978, NPDES Permit No. TX0004201 was issued to American Petrofina.<sup>15</sup>

#### State Solid Waste Management / RCRA

##### American Petrofina

RCRA ID No. TX0065099160.

##### Cosden

On May 3, 1976, the Texas Water Quality Control Board (“TWQCB”) registered the Petrogas Plant as a solid waste generator and assigned it Waste Registration No. 30521.<sup>16</sup> Under this registration, Cosden disposed of sludge from its wastewater settling pond on the refinery’s land farm.<sup>17</sup> On July 6, 1977, Solid Waste Registration No. 30521 was amended to reflect a change relating to the management of spent caustic solution.<sup>18</sup> Beginning on April 1, 1977, the Petrogas Plant began piping 156 gallons of spent caustic waste from the scrubber that generated it to the wastewater treatment plant of the adjacent refinery for use as a buffer solution.<sup>19</sup> An inspection, conducted on January 26, 1982, noted that the spent caustic was stored in a closed, aboveground storage tank within secondary containment and pumped once weekly to an equalization basin associated with the wastewater treatment facility where it was used for pH adjustment.<sup>20</sup> On April 23, 1984, American Petrofina submitted an Affidavit of Exclusion for the tank used to store spent caustic, claiming an “Accumulation Time” storage exclusion because it emptied the tank once per week. As of November 1985, the Texas Department of Water Resources (“TDWR”) had not accepted the request.<sup>21</sup>

Cosden, RCRA ID No. TXD060707965. In a letter dated August 8, 1986, the USEPA notified Cosden that it had reason to believe that the Petrogas Plant might not be RCRA-compliant because it had not submitted waste minimization information.<sup>22</sup>

##### BFLP

On October 16, 2000, BFLP submitted a Notification of Regulated Waste Activity to the USEPA, indicating

<sup>14</sup> B. P. Corporation, Industrial Wastewater Discharge Permit No. 00491; TDWR, Effluent Report, American Petrofina Company of Texas, Permit No. 00491, May 28, 1985.

<sup>15</sup> Fact Sheet (R06-9716636), December 6, 1979.

<sup>16</sup> George E. Maxon, Jr., letter to Cosden Oil & Chemical Co., May 6, 1976; Texas Water Quality Board, Notice of Registration, May 3, 1976.

<sup>17</sup> Texas Department of Water Resources, Notice of Registration, January 31, 1983; Walter W. Loper, Cosden Oil & Chemical Co., letter to Texas Water Quality Board, February 27, 1976.

<sup>18</sup> J. C. Mahon, American Petrofina Company of Texas, letter to Texas Department of Water Resources, March 18, 1982.

<sup>19</sup> Walter W. Loper, Cosden Oil & Chemical Co., letter to Texas Water Quality Board, April 1, 1977.

<sup>20</sup> David Buchanan to Gary Schroeder, interoffice memorandum, Texas Department of Water Resources, March 8, 1982.

<sup>21</sup> Burt L. St. Cyr, letter to Texas Department of Water Resources, April 23, 1984; Texas Water Commission, Solid Waste Compliance Monitoring Inspection Report, Cosden Chemical Division, November 6, 1985.

<sup>22</sup> USEPA to Fina Oil and Chemical Co. – Cosden, August 8, 1986.

**Part 3 – Permits**

that the facility generated more than 2,200 lbs. of hazardous waste.<sup>23</sup>

BFLP's carbon absorption system ("CAS") was permitted under TCEQ standard permit No. 50827. In May 2003, BFLP requested USEPA approval to register the CAS as a back-up control device to its thermal oxidizer under NSPS Part 60 Subparts NNN and RRR.<sup>24</sup>

**Part 4 – Complaints, NOV's, Consent Orders, Enforcement Actions****American Petrofina**

In 1978, the USEPA found that American Petrofina did not have a proper flow measuring device on Outfall 002. Agency sampling identified 24 toxic pollutants in the flow from Outfall 002, which discharged to the Molasses Bayou and wetlands area proximate to the refinery. In addition, treated process water discharged from Outfall 003 to the Molasses Bayou contained five toxic compounds. An excerpt from the agency's findings is presented below.<sup>25</sup>

**TOXIC/HAZARDOUS POLLUTANTS ASSESSMENT**

The "uncontaminated discharge" through outfall 002 contained the following 24 toxic pollutants:

Pollutant	ug/l	Pollutant	ug/l	Pollutant	ug/l
Carbon tetrachloride	61	Toluene	8	C <sub>3</sub> sub benzene	
1,1,1-trichloroethane	460	1,4-dichlorobenzene	15	C <sub>4</sub> sub benzene	
1,1-dichloroethene	91	Naphthalene	7	C <sub>5</sub> sub benzene	200
Chloroform	260	Phenanthrene	3	C <sub>1</sub> sub naphthalene	
1,1 dichloroethylene	26	Flourene	2	C <sub>2</sub> sub napthalene	
Ethylbenzene	7	Phenolics	11	C <sub>3</sub> sub naphthalene	
Methylene chloride	14	Cyanide	16	Chromium	45
Dichlorobromomethane	18	Arsenic	3	Zinc	70

The treated process water (Outfall 003) contained the following toxics.

Pollutant	ug/l	Pollutant	ug/l
Methylene chloride	1400	Toluene	4
Phenol	0.25	Arsenic	3
Total chromium	65		

<sup>23</sup> BFLP, Notification of Regulated Waste Activity, October 16, 2000.

<sup>24</sup> Jannetta Bowden, letter to USEPA Region 6, May 20, 2003.

<sup>25</sup> Fact Sheet (R06-9716636), December 6, 1979.

## Part 4 – Complaints, NOVs, Consent Orders, Enforcement Actions

In a 1986 RCRA Preliminary Assessment, the USEPA identified nine potential SWMUs at the American Petrofina refinery and found that releases were highly likely to have occurred at three of the SWMUs.<sup>26</sup> An excerpt from the RCRA Preliminary Assessment Summary documenting this issue is presented below:

**P. NUMBER OF SWMU AT WHICH A RELEASE IS HIGHLY POSSIBLE: 3**

(SIs should be conducted for each SWMU in this category unless an RI under C. has been indicated which will include this SWMUs).

<u>LIST OF SWMU</u>	<u>REASONS</u> (i.e., waste characteristics, depth of GW, soil permeability, etc.)
(1) Surface Impoundment (ROR-1)	-Overtopping and lack of freeboard.
(2) Container Storage Area (ROR-4)	-Partially empty drums stored upside down drum spewing contents on ground-pressurized from sun's heat; and drums improperly closed had collected rain-water.
(3) Landfarm	-Improper closure due to lack of sampling; high potential for releases to groundwater considering waste management practices.

The Preliminary Assessment Summary also indicated that the USEPA agreed with the TWC's recommendation for a Site Investigation of the surface impoundment area, container storage area, and Biological Treatment Aeration Pond.

### Cosden

A TWC inspection of the Petrogas Plant conducted on November 6, 1985, concluded that both a tank used to store spent caustic and the earthen storm water basin where spent caustic was diluted with runoff prior to being pumped to the wastewater treatment unit associated with the adjacent refinery constituted hazardous waste facilities. The wastewater treatment facility treated and discharged the effluent through Outfall 001, which discharged to the Molasses Bayou wetlands area. As such, the inspector noted, both the Petrogas Plant and the refinery lacked all RCRA requirements for hazardous waste facilities. Further, Cosden had not provided notification of the tank and the surface impoundment as hazardous waste storage facilities. In addition, the inspection noted that the site's pumping system continued to be overwhelmed during heavy rainfall, resulting in storm water and spent caustic from the earthen storm water basin discharging through Outfall 001.<sup>27</sup> On November 18, 1985, the TWC District 6 Office submitted an enforcement request to the TWC central office.<sup>28</sup> In December 1986, the Texas Railroad Commission assumed jurisdiction in the case. In January 1987, the TWC concluded that no further action on its part was necessary.<sup>29</sup>

On January 29, 1985, the USPEA conducted an NPDES Compliance Inspection of the refinery. During the

<sup>26</sup> RCRA Preliminary Assessment Summary, American Petrofina (R06-9716625), April 17, 1986. Requests for documents relating to additional environmental investigations have been submitted but have not yet been received.

<sup>27</sup> TWC, Solid Waste Compliance Monitoring Inspection Report, Cosden Chemical Division, November 6, 1985.

<sup>28</sup> Harry D. Boudreaux to Mert Coloton, interoffice memorandum, TWC, November 18, 1985; Ann C. Dobbs to Bob Lee, interoffice memorandum, TWC, January 16, 1987.

<sup>29</sup> Ann C. Dobbs to Bob Lee, interoffice memorandum, TWC, January 16, 1987.



#### **Part 4 – Complaints, NOVs, Consent Orders, Enforcement Actions**

inspection, a slight sheen of oil was observed from effluent emanating from Outfalls Nos. 001, 002, and 003. Grease was seen in the effluent at Outfalls Nos. 001, 002, and 003.<sup>30</sup> The USEPA inspector noted that the oil and grease accumulation at Outfalls 001 and 002 were contained by booms at the property line. American Petrofina claimed to vacuum out these areas on a routine schedule, but the inspection report noted that “a rain storm could easily wash these accumulations out into the receiving streams or marshes.” American Petrofina was experiencing elevated pH levels at Outfall 002 which the USEPA indicated “could” be caused by a steam condensate discharge just upstream of the outfall. The soil along the runoff path from the condensate discharge was cobalt blue. The water in the outfall was bright green, potentially indicating a copper salt problem.<sup>31</sup>

On May 3, 1985, a refinery transfer line failed and approximately 6,000 barrels of clarified oil spilled into the process sewer. The line failed in a catch basin where the transfer line crossed the header to the wastewater treatment system transversely. By the time that the source of the oil was identified, the oil had passed through the CPI separators, the Dissolved Air Flotation Unit, and the equalization basin, and had accumulated in the Aeration Basin. Trace quantities were found in the final clarifier. The only permit exceedances arising from the spill was for BOD<sub>5</sub> and ammonia.<sup>32</sup>

On May 28, 1985, the Texas Department of Water Resources conducted an inspection of the refinery, owing to numerous self-reported non-compliances. The TDWR found that the effluent from Outfall 003 was non-compliant because of a high ammonia-nitrogen concentration.<sup>33</sup>

On September 6, 1986, the effluent from Outfall 002 was acidic with a pH of 3.2, owing to a leak in an acid line. The line was taken out of service until repairs were made.<sup>34</sup>

On December 8, 1986, Fina Oil discharged 1,871.4 lbs. of oil and grease to Outfall 003, which was more than 3.5 times the permitted limit of 490 lbs. per day. The discharge was caused by oily, biological sludge that discharged from the final clarifier.<sup>35</sup>

A TWC inspection conducted on June 2, 1987, noted that spent caustic continued to be stored in a carbon steel aboveground storage tank at the Petrogas plant, but from there it was now transferred to the wastewater treatment facilities of the adjacent refinery by either direct discharge into the process sump or vacuum truck. That is, it no longer was discharged to the surface impoundment. The company had not yet established interim status for its hazardous waste facilities and so remained in violation of all applicable regulations. The company contended that spent caustic was not solid waste and that therefore it had not analyzed the waste. A sample collected from the tank during the inspection contained a pH level of 13.7, confirming that the spent caustic was hazardous waste.<sup>36</sup>

<sup>30</sup> USEPA, NPDES Compliance Inspection Report, January 29, 1985, Section L.

<sup>31</sup> Letter from American Petrofina Company of Texas to the USEPA, February 8, 1985; USEPA, NPDES Compliance Inspection Report, January 29, 1985, Section L.

<sup>32</sup> Letter from American Petrofina Company of Texas to the USEPA, June 5, 1986.

<sup>33</sup> TDWR, Effluent Report, May 28, 1985.

<sup>34</sup> Letter from American Petrofina Company of Texas to the USEPA, September 10, 1986.

<sup>35</sup> Letter from American Petrofina Company of Texas to the USEPA, December 8, 1986.

<sup>36</sup> TWC, Solid Waste Compliance Monitoring Inspection Report, Cosden Chemical Division—Petrogas Plant, June 22, 1987; Pat Fontenot to Sam Pole, interoffice memorandum, TWC, June 22, 1987.

#### **Part 4 – Complaints, NOVs, Consent Orders, Enforcement Actions**

Between December 1989 and January 1990, effluent discharged from Outfall 003 exceeded BOD<sub>5</sub> permit levels eight times. According to Fina Oil, these exceedances were caused by record cold temperatures that affected mechanical equipment and the wastewater treatment unit.<sup>37</sup>

During May 1991, the discharge to Outfall 001 generated by the refinery exceeded pH levels 11 times. Fina Oil stated that these exceedances were caused by a large amount of alkaline construction materials that had been placed on the 16 acres adjacent to collection system for Outfall 001. Also during May, five oil sheens were observed each from Outfalls 001 and 002. Fina Oil attributed these sheens to construction on the adjacent 16 acres of property. During flooding in June, five barrels of oil associated with 10,000 barrels of storm water discharged into the Motor Boat Canal when the South Wastewater Conveyance System Storm Water Transfer Pump Station was not activated.<sup>38</sup>

In September 1991, Fina Oil informed the USEPA that the company was planning on building a retention basin upstream of Outfall 001 to provide sufficient time to retain storm water to allow oil to separate from the water prior to discharge.<sup>39</sup> During the construction of the basin, discharges from Outfall 001 exceeded permitted pH levels as a result of water coming into contact with concrete as it cured.<sup>40</sup>

In October 1991, Fina Oil experienced a temporary bypass of untreated water that entered into the Motor Boat Canal from the refinery. Approximately two barrels of oil were recovered from the contained area and an undetermined amount of untreated water entered into the Motor Boat Canal. Test results indicated that the untreated process wastewater contained phenols at 2.1 mg/L, which exceeded NPDES-permitted levels.<sup>41</sup>

For the month of November 1991, Fina Oil averaged 216.2 lbs. per day of ammonia-nitrogen in its discharge to Outfall 003 from the refinery, which exceeded its NPDES-permitted daily average for the month of 195 lbs. per day.<sup>42</sup>

A table summarizing the number of NPDES violations is attached as Table 1.

#### **Part 5 – Environmental Studies or Investigations**

Regulatory agency requests have been submitted to obtain additional materials.

<sup>37</sup> Letter from Fina Oil and Chemical Company to the TWC, April 23, 1991, pp. 1–2.

<sup>38</sup> Letter from Fina Oil and Chemical Company to the USEPA, August 5, 1991, pp. 1–4; Letter from Fina Oil and Chemical Company to the USEPA, August 12, 1991.

<sup>39</sup> Letter from Fina Oil and Chemical Company to the USEPA, September 24, 1991, p. 1.

<sup>40</sup> Letter from Fina Oil and Chemical Company to the USEPA, December 3, 1991, p. 1.

<sup>41</sup> Letter from Fina Oil and Chemical Company to the USEPA, October 22, 1991, p. 1.

<sup>42</sup> Letter from Fina Oil and Chemical Company to the USEPA, December 19, 1991, p. 2.

## Part 6 – Pathway

When American Petrofina acquired the refinery it had three outfalls that impacted the present day Site, as follows: Outfall 001, an open drainage ditch, discharged storm water runoff into the wetlands; Outfall 002, an open drainage ditch, discharged untreated, once-through cooling water into the wetlands; and Outfall 003 discharged treated process waste streams through a 24" pipe to the Motor Boat Canal and then to both the Molasses Bayou and Neches River. Contaminants from Outfalls 001 and 002 including Polycyclic Aromatic Hydrocarbons ("PAHs") and metals would have made their way to the wetlands area and/or traveled to the Molasses Bayou Waterway, which drains the wetlands proximate to the refinery.<sup>43</sup>

An outfall and discharge figure for the refinery dated June 27, 1981 (Figure 2), shows the Motor Boat Canal connected to the right prong of Molasses Bayou, indicating that treated process water discharged from Outfall 003 flowed to the Molasses Bayou as well as to the Neches River from the canal.<sup>44</sup>

In addition, the North Ditch, a 16-foot-wide ditch cut through the marsh, which historically served as the primary conveyance to the Neches River for process waste water discharged from the refinery, was repurposed to receive only emergency overflow as part of a wastewater treatment system update that took place between 1970 and 1972.<sup>45</sup> By 1981, the North Ditch was channelized and lined, with a flume carrying effluent over the Molasses Bayou to the Neches River. It is unclear precisely when the North Ditch was lined.

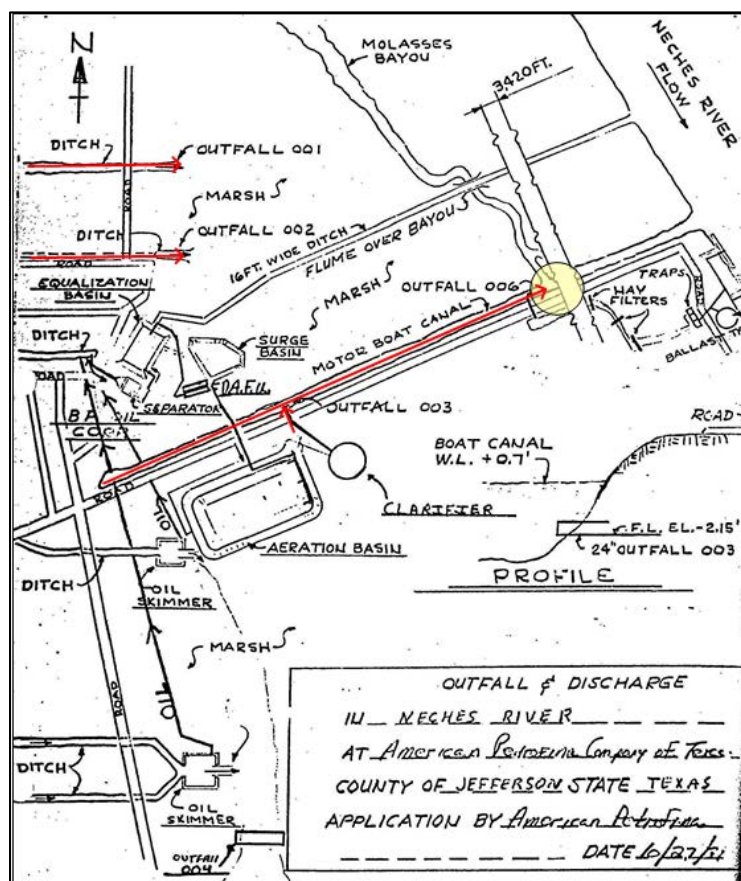


Figure 2. Source: American Petrofina, Outfall and Discharge Map, June 27, 1981

<sup>43</sup> B. P. Corporation, Industrial Wastewater Discharge Permit No. 00491.

<sup>44</sup> A 1943 USGS topographical map and USGS aerial photographs from 1952, 1956, and 1970 also support that the Motor Boat Canal flowed into Molasses Bayou as well as the Neches River.

<sup>45</sup> B. P. Corporation, Industrial Wastewater Discharge Permit No. 00491; Wastewater Treatment Plant, diagram, undated; Marshall Elliott and Larry Smaihall, Atlantic Richfield Refining Co., Industry Survey, November 1, 1967.

## **Part 7 – Nexus Summary**

### **Refinery**

American Petrofina and its successors have operated the refinery from 1973 to the present. Effluent from the refinery discharged directly to the Molasses Bayou and wetlands area proximate to the refinery from Outfalls 001 and 002.

Storm water and other flows were discharged through Outfall 001. Over time, these flows included a variety of contaminants, including spent caustic and oil, that were linked to oil sheens and elevated pH in analytical results. Wastes from Outfall 002 were found to contain a variety of semi-volatile organic compounds (“SVOCs”), volatile organic compounds (“VOCs”), PAHs, and metals, including chromium, zinc and arsenic. Treated wastewater was discharged to the Motor Boat Canal at Outfall 003. As described in Part 6, the Motor Boat Canal was connected to the Molasses Bayou.<sup>46</sup> Wastes documented as having been discharged from Outfall 003 in late-1970s included methylene chloride, phenol, chromium, toluene, and arsenic.<sup>47</sup>

Between 1991 and 1993, Fina Oil, the refinery operator, took a number of steps to eliminate the sources of petroleum product discharges through its outfalls, indicating that releases had been occurring prior to that date.<sup>48</sup>

### **Petrogas Plant**

Construction of the Petrogas Plant was completed around 1976.<sup>49</sup> Prior to 1982, during heavy storms, oily water discharged to the Molasses Wetlands (marsh) through a ditch associated with an unpermitted outfall (Outfall 001).<sup>50</sup> Flows discharged to the marshy area would have flowed to the Molasses Bayou Waterway. As of 1983, storm water and process water was pumped from a surge/settling basin to the refinery’s wastewater treatment system.<sup>51</sup> In 1991, the Petrogas Plant ceased operations and was scheduled for demolition sometime after August 1993.<sup>52</sup>

### **Steam Cracker and C4 Complex**

This complex had three sumps, water from which was pumped to aboveground storage tanks and then to the adjacent refinery, where it was treated in the wastewater treatment system and discharged under an NPDES permit. The facility had one “in ground unit,” known as the Outfall 001 Pond (not the Outfall 001 associated with the former Petrogas Plant). The inspection report concluded that there were “no obvious areas of concern related to surface impoundments” on site.<sup>53</sup>

### **Connection to the Star Lake Superfund Site**

Based on available information, historical industrial waste water and storm water discharges associated with the Site contributed to the contamination of both the Molasses Bayou Waterway and the Molasses Bayou Wetlands AOIs. The primary contributing pathway associated with Site operations is the “right prong” of the

<sup>46</sup> B. P. Corporation, Industrial Wastewater Discharge Permit No. 00491; Wastewater Treatment Plant, diagram, undated.

<sup>47</sup> Fact Sheet (R06-9716636), December 6, 1979.

<sup>48</sup> Fina Oil and Chemical Company, Port Arthur Refinery: Spill Prevention Actions, October 16, 1992.

<sup>49</sup> George E. Maxon, Jr., letter to Cosden Oil & Chemical Co., May 6, 1976; TWQCB, Notice of Registration, May 3, 1976.

<sup>50</sup> David Buchanan to Gary Schroeder, interoffice memorandum, TDWR, March 8, 1982; TDWR, letter to Walter W. Loper, Plant Manager, March 8, 1982.

<sup>51</sup> TDWR, Notice of Registration, December 2, 1983; Burt L. St. Cyr, American Petrofina Company of Texas, letter to TDWR, February 23, 1984.

<sup>52</sup> Jeff Baker, letter to the TWC, August 10, 1993.

<sup>53</sup> David Robertson, USEPA Region 6, RCRA Inspection Report, BASF FINA Petrochemicals LP, August 6, 2008.



## Part 7 – Nexus Summary

Molasses Bayou Waterway, which joins the “left prong” of the Molasses Bayou Waterway within the boundary of the Molasses Bayou Wetlands AOI.<sup>54</sup>

The ROD divided the Site into seven AOIs.<sup>55</sup> The potential source area includes the impacted sediments of the Star Lake and Jefferson Canals and the Molasses Bayou.<sup>56</sup> Regarding the latter, the “left prong” of the Molasses Bayou Waterway is defined as the AOI under the ROD. As defined, this AOI extends downstream of the point of confluence of the left and right prongs of the waterway to the Neches River.<sup>57</sup> As noted above, sampling performed in 1978 identified 24 toxic pollutants in the effluent from the refinery’s Outfall 002, which was proximate to the “right prong” of the Molasses Bayou. Contamination from the “right prong” of the Molasses Bayou would have contributed to the contamination of the Molasses Bayou Waterway AOI. The following discussion of sampling results illustrates contaminant pathways to the Superfund Site, but should not be interpreted to be the only sampling information that links the refinery effluent discharges to the Site.

Surface water samples were collected from 13 locations on the Molasses Bayou during the Remedial Investigation (“RI”). PAHs, SVOCs, VOCs, and metals were detected in multiple samples. SVOCs and VOCs were detected at sample locations both upstream and downstream of the left-right-prong confluence. As an example, with regard to PAHs and metals, analysis of the surface water sample location MB-13 on the right prong of the Molasses Bayou detected PAH constituents and a number of metals. PAHs and metals were also found at surface water sample location MB-10, which is downstream of MB-13 and after the confluence of the left and right prongs of the Molasses Bayou Waterway.<sup>58</sup>

Surface sediment samples were collected at locations associated with the Molasses Bayou AOI during the RI. As an example, samples were collected at five locations in the Molasses Bayou Waterway AOI, including MB-13 and MB-10 downstream of the Site. PAHs and VOCs constituents, metals, and pesticides were detected in sediments. As noted above, PAHs and metals were found in effluent discharged from Site outfalls to the Molasses Bayou and Molasses Wetlands.<sup>59</sup>

Additional sampling conducted during the RI provides additional support for the nexus between waste water and storm water discharges from the Site and contamination of both the Molasses Bayou Waterway and the Molasses Bayou Wetlands AOIs. For example, PAHs detected in surface water sample MB-13 were also found in sample MB-49, which is downstream of the confluence of the left and right prongs of the Molasses Bayou Waterway. Metals were also detected in several downstream samples locations. At surface sediment sample location MB-51, located in wetlands adjacent to the Molasses Bayou Waterway downstream of the left-right-prong confluence, PAH and VOC constituents, metals, and PCBs found at surface sediment sample location MB-13 were detected.<sup>60</sup> These sample locations are shown on Figure 4-4 of the RI report (attached).

Based on the historical pathway from the TOTAL Refinery outfalls to the right prong of the Molasses Bayou and wetlands area, as well as the presence of contaminants documented as being released from the refinery to those pathways there is a nexus between the TOTAL Refinery and the contamination being addressed at the Star Lake Superfund Site and the Molasses Bayou Waterway and Wetlands AOIs in particular.<sup>61</sup>

<sup>54</sup> USEPA Region 6, *Record of Decision: Star Lake Canal Superfund Site*, September 2013, pp. 62–64.

<sup>55</sup> USEPA Region 6, *Record of Decision*, pp. 1–3, figure 2.

<sup>56</sup> Conestoga-Rovers & Associates and Cardno ENTRIX, *Final Tier 2 Remedial Investigation Report*, August 2011, p. 43.

<sup>57</sup> Conestoga-Rovers & Associates and Cardno ENTRIX, *Final Tier 2 Remedial Investigation Report*, figure 3-1.

<sup>58</sup> Conestoga-Rovers & Associates and Cardno ENTRIX, *Revised Draft 1 RI Report*, vol. 1, pp. 37–8, figure 5-4.

<sup>59</sup> Conestoga-Rovers & Associates and Cardno ENTRIX, *Revised Draft 1 RI Report*, vol. 1, pp. 42–3, figure 5-8A.

<sup>60</sup> Conestoga-Rovers & Associates and Cardno ENTRIX, *Revised Draft 1 RI Report*, vol. 1, figures 5-4, 5-8A; Conestoga-Rovers & Associates and Cardno ENTRIX, *Final Tier 2 Remedial Investigation Report*, August 2011, tables 6-1C, 6-2F.

<sup>61</sup> USEPA Region 6, *Record of Decision*, pp. 62–7.



## Part 8 – Corporate Succession and Relationships

### American Petrofina, Inc. to Fina, Inc.

- On April 18, 1956, American Petrofina incorporated in Delaware. The company was affiliated with Petrofina S.A., through its wholly owned subsidiary, American Petrofina Holding Company.<sup>62</sup>
- In April 1991, American Petrofina, Inc. changed its name to Fina, Inc.<sup>63</sup>
- In 1999, Total S.A. acquired Petrofina S.A. through merger and changed its name to Total Fina S.A.<sup>64</sup>
- In 2000, Total Fina S.A. acquired Elf Aquitaine through merger and changed its name to Total Fina Elf S.A.<sup>65</sup>
- In August 2000, Texas terminated Fina, Inc.'s right to transact business in the state.<sup>66</sup>

### Cosden Oil & Chemical Company to Total Petrochemicals & Refining USA, Inc.

- On June 24, 1958, American Petrofina Company of Texas incorporated in Delaware.<sup>67</sup>
- In April 1963, American Petrofina, Inc. acquired assets of Cosden Petroleum Corporation and incorporated Cosden Oil & Chemical Company in Delaware as a wholly owned subsidiary. Cosden Oil & Chemical Company filed as a foreign corporation in Texas.<sup>68</sup>
- In July 1985, Cosden Oil & Chemical Company, American Petrofina Company of Texas, and four other companies merged, with American Petrofina Company of Texas being the surviving entity.<sup>69</sup>
- On July 24, 1985, American Petrofina Company of Texas changed its name to Fina Oil and Chemical Company.<sup>70</sup> Fina Oil and Chemical Company operated as a wholly owned subsidiary of American Petrofina, Inc./Fina, Inc.<sup>71</sup>
- In 1999, Total S.A. acquired Petrofina S.A. through merger and changed its name to Total Fina S.A.<sup>72</sup>
- In 2000, Total Fina S.A. acquired Elf Aquitaine through merger and changed its name to Total Fina Elf S.A.<sup>73</sup>
- On June 7, 2000, Fina Oil and Chemical Company changed its name to Atofina Petrochemicals, Inc.<sup>74</sup>
- In 2003, Total Fina Elf S.A. adopted the name, Total S.A.<sup>75</sup>
- On September 29, 2004, Atofina Petrochemicals, Inc. changed its name to Total Petrochemicals USA, Inc.<sup>76</sup>

<sup>62</sup> Moody's Industrial Manual, 1990, vol. 1, p. 2571.

<sup>63</sup> Moody's Industrial Manual, 1998, vol. 1, p. 3263.

<sup>64</sup> Mergent Industrial Manual, 2005, vol. 2, p. 4593, 4595.

<sup>65</sup> Mergent Industrial Manual, 2005, vol. 2, p. 4593, 4595.

<sup>66</sup> Accurint – Fina, Inc. – Corporation Report.

<sup>67</sup> Delaware Secretary of State, Certificate of Amendment, July 1, 1985.

<sup>68</sup> *Moody's Industrial Manual*, 1990, vol. 1, p. 2571; Texas Secretary of State, Certificate of Authority, Cosden Oil & Chemical Company, April 23, 1963; idem, Application, Cosden Oil & Chemical Company, April 17, 1963.

<sup>69</sup> Texas Secretary of State, Articles of Merger of Domestic and Foreign Corporations into American Petrofina Company of Texas, July 2, 1985; Paul D. Meek, Notice—Change of Name, undated [July 1985].

<sup>70</sup> Delaware Secretary of State, Certificate of Amendment, July 1, 1985.

<sup>71</sup> Moody's Industrial Manual, 1990, vol. 1, p. 2571; Moody's Industrial Manual, 1998, vol. 1, p. 3263.

<sup>72</sup> Mergent Industrial Manual, 2005, vol. 2, p. 4593, 4595.

<sup>73</sup> Mergent Industrial Manual, 2005, vol. 2, p. 4593, 4595.

<sup>74</sup> Delaware Secretary of State, Certificate of Amendment, June 7, 2000.

<sup>75</sup> Mergent Industrial Manual, 2005, vol. 2, p. 4593, 4595.

## **Part 8 – Corporate Succession and Relationships**

- On January 17, 2012, Total Petrochemicals USA, Inc. changed its name to Total Petrochemicals & Refining USA, Inc.<sup>77</sup>

### **BASF FINA Petrochemicals LP**

- In September 1997, BASF Corporation and Fina Oil and Chemical Company formed a joint venture, BASF FINA Petrochemicals LP, to construct a naphtha steam cracker on 60 acres adjacent to the refinery.<sup>78</sup>

### **Sabina Petrochemicals LLC to BASF TOTAL Petrochemicals LLC**

- In 2000, BASF Corporation, Atofina Petrochemicals, Inc., and Shell Chemical Co. formed a joint venture, Sabina Petrochemicals LLC, to construct and operate an integrated C4 olefins complex at the site that would include the world's largest single train butadiene extraction unit.<sup>79</sup>
- In August 2011, Shell exited Sabina Petrochemicals LLC, leaving BASF Corporation and Total Petrochemicals & Refining USA, Inc. as sole owners of the joint venture.<sup>80</sup>
- In 2012, BASF Corporation and Total Petrochemicals & Refining USA, Inc. agreed to merge BASF FINA Petrochemicals LP and Sabina Petrochemicals LLC into a single joint venture, BASF TOTAL Petrochemicals LLC.<sup>81</sup>

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<sup>76</sup> Delaware Secretary of State, Certificate of Amendment, September 29, 2004.

<sup>77</sup> Texas Secretary of State, Amendment to Registration, January 17, 2012.

<sup>78</sup> BASF Corporation, "BASF and Total Petrochemicals & Refining USA Inc.'s Joint Venture Changes Legal Name," news release, September 4, 2012.

<sup>79</sup> Alan S. Brown, "Shell, BASF, Atofina Approve Port Arthur C4 Olefins Complex," *Chemical Online*, 11/3/2000.

<sup>80</sup> BASF Corporation, "BASF and Total Petrochemicals & Refining USA Inc.'s Joint Venture Changes Legal Name," press release, September 4, 2012.

<sup>81</sup> BASF Corporation, "BASF and Total Petrochemicals & Refining USA Inc.'s Joint Venture Changes Legal Name," press release, September 4, 2012.

## **Part 9 – Acronym List**

AOI – Area of Investigation  
ARCO – Atlantic Richfield Company  
BFLP – BASF FINA Petrochemicals LP  
BOD – Biological Oxygen Demand  
CAS – Carbon Adsorption System  
Cosden – Cosden Oil & Chemical Company  
CPI – Corrugated Plate Interceptor  
lbs. – pounds  
LPG – Liquefied Petroleum Gas  
mg/L – milligrams per liter  
MNR – Monitored Natural Recovery  
NOV – Notice of Violation  
NPDES – National Pollutant Discharge Elimination System  
NSPS – Standards of Performance for New Stationary Sources  
PAH – Polycyclic Aromatic Hydrocarbon  
PCB – Polychlorinated Biphenyl  
RCRA – Resource Conservation and Recovery Act  
ROD – Record of Decision  
SVOC – Semi-Volatile Organic Compound  
TCEQ – Texas Commission of Environmental Quality  
TDWR – Texas Department of Water Resources  
TWC – Texas Water Commission  
TWQCB – Texas Water Quality Control Board  
USEPA – United States Environmental Protection Agency  
USGS – United States Geological Survey  
VOC – Volatile Organic Compound

## **Table and Figure**

**Table 1: NPDES Violations for Outfalls\***

Year	Outfall	BOD <sub>5</sub>	Oil & Grease	pH	TSS	Ammonia-Nitrogen	TOC	Phenol
1985 <sup>1</sup>	Outfall 1	-	1 <sup>3</sup>	1 <sup>4</sup>	-	-	13 <sup>8</sup>	-
	Outfall 3	9 <sup>2</sup>	-	1 <sup>5</sup>	1 <sup>6</sup>	69 <sup>7</sup>	-	-
1986 <sup>9</sup>	Outfall 1	-	1	1	-	-	10	-
	Outfall 2	-	-	1	-	-	-	-
	Outfall 3	10	3	2	2	32	-	-
	Outfall 4	-	-	1	-	-	-	-
1987 <sup>10</sup>	No data							
1988 <sup>11</sup>	Outfall 4		1					
1989 <sup>12</sup>	Outfall 1	-	-	1	-	-	-	-
	Outfall 2	-	6	1	-	1	-	-
	Outfall 3	3	1	4	-	1	-	-
1990 <sup>13</sup>	Outfall 1	-	-	3	-	-	-	-
	Outfall 2	-	1	-	-	-	1	-
	Outfall 3	7	3	1	5	4	2	2
1991 <sup>14</sup>	Outfall 1	-	3	25	-	-	4	-
	Outfall 2	-	3	3	-	-	2	-
	Outfall 3	10	1	3	3	10	-	1
	Outfall 4	-	2	-	-	-	-	-

\* The outfall is only listed if a NPDES violation occurred during the year.

<sup>1</sup> The exceedances for the year 1985 came from letters sent from American Petrofina Company to the USEPA. The letters appear to only cover the first half of 1985.

<sup>2</sup> Letters from American Petrofina Company of Texas to the USEPA, 5/16/1985 (3 exceedances); 6/13/1985 (3); 6/26/1985 (3).

<sup>3</sup> Letter from American Petrofina Company of Texas to the USEPA, RE: Outfall 1, 6/18/1985.

<sup>4</sup> Letter from American Petrofina Company of Texas to the USEPA, 2/1/1985.

<sup>5</sup> Letter from American Petrofina Company of Texas to the USEPA, 2/20/1985.

<sup>6</sup> Letter from American Petrofina Company of Texas to the USEPA, 6/7//1985.



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<sup>7</sup> Letters from American Petrofina Company of Texas to the USEPA, 2/12/1985 (16 exceedances) 3/1/1985 (8); 3/19/1985 (3); 3/25/1985 (1); 4/03/1985 (2); 4/12/1985 (3); 4/19/1985 (3); 4/26/1985 (3); 5/03/1985 (3); 5/10/1985 (3); 5/17/1985 (2); 5/24/1985 (2); 5/31/1985 (3); 6/07/1985 (3); 6/13/1985 (2); RE: Outfall 3, 6/18/1985 (2); 6/24/1985 (2); 6/27/1985 (2); 7/03/1985 (3); 7/10/1985 (3).

<sup>8</sup> Letters from American Petrofina Company of Texas to the USEPA, 1/10/1985 (2 exceedances); 1/16/1985 (2); 1/22/1985 (1); 2/5/1985 (1); 2/8/1985 (3); 3/8/1985 (1); 4/4/1985 (1); 6/13/1985 (1); 6/18/1985 (1).

<sup>9</sup> Discharge Monitoring Reports, January – December 1986.

<sup>10</sup> No data available for 1987.

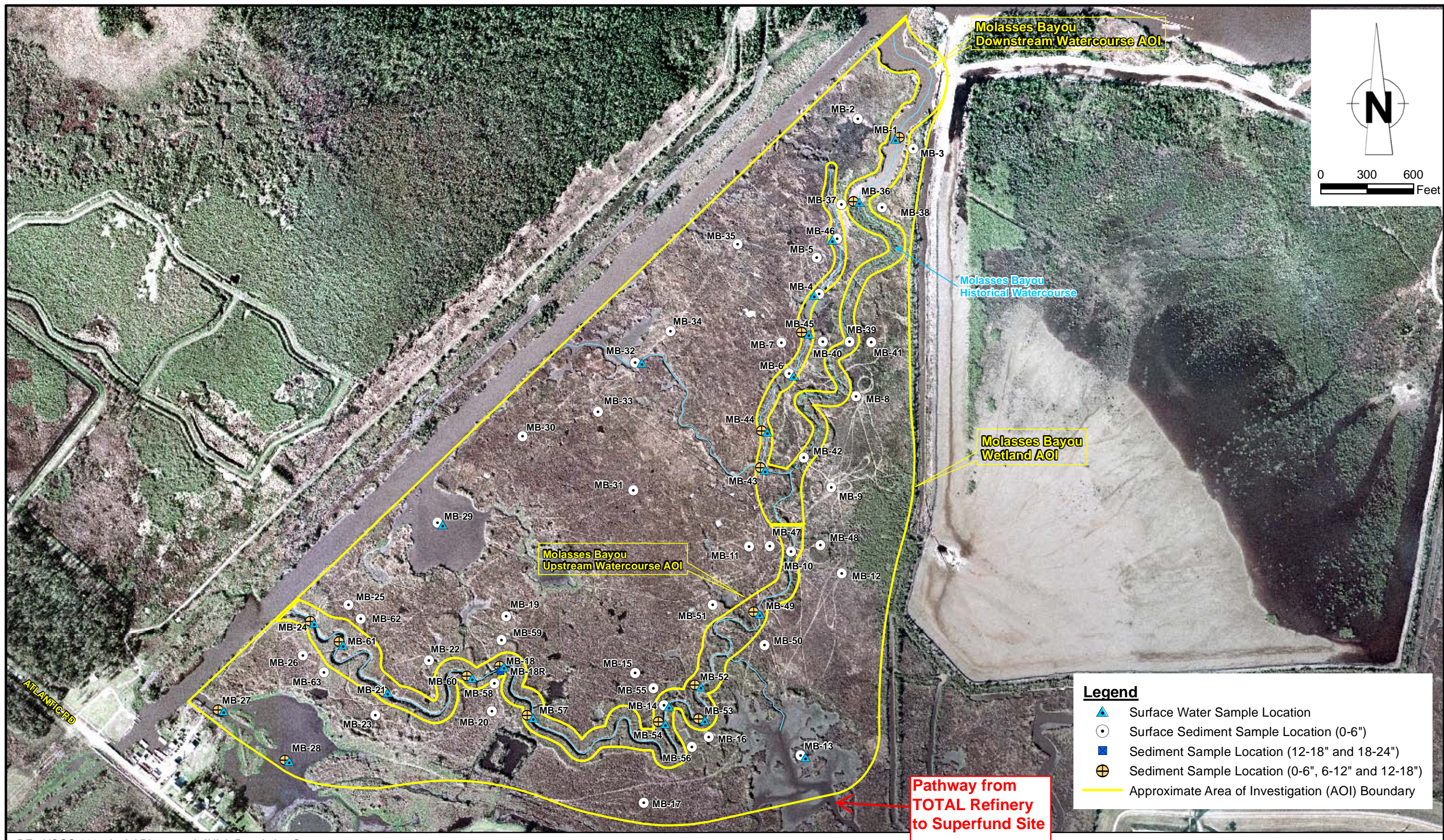
<sup>11</sup> Data is only available for October through December. No violations noted for these months. See NPDES Violation Summary, 1988-1990.

<sup>12</sup> NPDES Violation Summary, 1988-1990.

<sup>13</sup> NPDES Violation Summary, 1988-1990.

<sup>14</sup> Discharge Monitoring Reports, January – December 1991.





RE: USGS 2007 Aerial Photograph "High Resolution State Orthomimagery for Southeast Texas."



**Figure 4-4**  
**TIER 1 AND TIER 2 REMEDIAL INVESTIGATION SAMPLE LOCATIONS - MOLASSES BAYOU UPSTREAM, DOWNSTREAM, AND WETLAND AOIs**  
**STAR LAKE CANAL SUPERFUND SITE, JEFFERSON COUNTY, TEXAS**  
*Chevron Environmental Management Company, Bellaire, Texas*